

**DYNAMIC EVOLUTION: A
STUDY OF THE
CAUSES OF EVOLUTION
AND DEGENERACY**

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Dynamic Evolution: A Study of the Causes of Evolution and Degeneracy by Casper L. Redfield

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CHAPTER I

ENERGY

Matter and Energy Distinguished—Causes—Law and Rule Distinguished—Factors of Matter and Energy—Definition of Energy—Conservation and Dissipation of Energy—Forms of Matter and Energy—Available Energy.

OF primary things we know only Matter and Energy—space and time being simply factors in the measurement of matter and energy. Matter is a physical body which occupies space, has density, and offers resistance to energy. The word "Mass" is used to designate quantity of matter without respect to its shape, condition, quality, or density. Energy imparts motion to matter by overcoming resistance through a distance,

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and it exists in matter by virtue of such motion. Hence all motion involves energy. The expenditure of energy is represented by equal work performed, and work performed is represented by equal energy expended. Work and energy are often used synonymously, but work is in fact the act of transferring energy from one body to another. The fact of such transference is made evident by the changed relationship of bodies to each other. Because energy performs work equal to itself, it is commonly defined as "stored work." Matter is inert. It is the "vehicle of energy," but does nothing of itself. The distribution of matter affects the distribution of energy, but all changes, motions, and transformations of matter are the effects of energy acting on or through matter.

Structure is matter in an organized form. It involves everything from the arrangement of atoms in a molecule to the bony, muscular, and nervous systems of an animal. A bridge is a structure designed solely to resist strains. A machine is a structure which goes through

complicated movements by the application of outside energy. An animal is a structure which goes through still more complicated movements by the application of inside energy. The point here is that the size, shape, form, and color of an animal represent matter and not energy.

All things that happen are due to causes. As happenings involve motion, and as all motions come from energy, all causes are to be found in energy. Hence, energy is the same thing as the philosopher's First Cause, and includes what the theologians personify as God and Devil. Causes are either simple or composite, but whether simple or composite, a definite cause always produces definite and equal effects. A cause and its effects are different forms of the same thing, and are always equal to each other in amount. Hence, large causes produce large effects and small causes produce small effects or, in other words, effects are proportional to their causes.

Causes are forces acting upon matter.

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Forces act in straight lines,—curved motion being the resultant of two or more forces acting simultaneously on the same bodies. The magnitude of forces, the directions of their actions, and all resultants of two or more forces are subject to mathematical computations. Hence, all causes operate in accordance with mathematical laws. The mere fact that some composites of forces, particularly in living organisms, are so complex that they have not yet yielded to mathematical computation, does not negative this proposition.

A result may be the simple effect of a simple cause, or a composite of effects produced by a composite of causes. In any composite of causes, each individual cause produces its own effect uninfluenced by the presence or absence of other causes,—the result being a composite of the effects. If a composite of causes is variable in its composition, the result is correspondingly variable.

The variability in animals is due to the variability in the composites of causes which

produce the results observed. Facts are observed results.

A law of nature is the mathematical relationship of a simple cause to its effect, from the statement of which it is possible to determine things, operations, and results otherwise unknown. From the perturbations of Uranus and the law of gravitation, Leverrier located an unseen and previously unknown planet. From the qualities of known elements and the periodic law, Mendeleëff described three primary substances then unknown to science, and gave their compounds, and the qualities of those compounds.

The laws of nature are of universal application, and consequently, there is no such thing as an exception to a law of nature. When we find an exception to a generalized statement, that exception is proof that the statement represents usual results from a variable composite cause instead of from a simple cause, and hence, that the statement represents a rule and not a law.

The distinction between a "rule" and a